Exhibit 5

Strategic Railroading

A Technology Strategy in-sync with an Operational Strategy

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Mr. Lindsay appears to be correct. He gives good reasons why, as anyone with substantial experience in wireless data systems can readily understand.

He also explains below why railroads do not need 220-MHz range spectrum. They have VFH high band spectrum and if used properly it will serve the required purposes of mission-critical advanced wireless data for trains-- of which PTC is just one application.

PTC itself if not a technolgy, nor is it a standard (not that this time at least) but several safety objectives to be satisfied by wireless data (with associated means).

Mr. Linsay is a reasonable, cutting through jarjon, hype, politics and inertia.

Author Archive

Teddy Bear – "PTC is Vital"

June 14th, 2010 | Author: Ron Lindsey

"PTC is Vital."

["Teddy Bear" is defined by Mr. Lindsey on a page below-- it means commonly accepted by erroneous.]

It was a slow process, but perseverance has paid off. This Teddy Bear as to PTC being vital has only the faintest shade of presence. Most individuals that have anything to do with PTC now understand that PTC is NOT vital. But, just in case, here's the story.

It was in the earliest meetings of the PTC- Railroad Safety Advisory Committee (RSAC) process a decade or so ago that there was a great deal of confusion and misunderstanding as to what PTC was and what it did. Indeed, the first primary task for the RSAC members, that included FRA, rail management, labor representatives, and suppliers, was to define the "core objectives" of PTC. Within several RSAC sessions, the core objectives were determined to be 3-fold:

i.e.,

> keep trains from hitting trains, keep trains from over-speeding, and keep trains from endangering work gangs.

An additional objective of protecting against grade crossings was introduced but readily dropped due to the physics of train movements and the ownership of the property. That is, to stop a freight train in time to prevent an accident involving a grade crossing situation, e.g., failure of gate to lower, would require such a long time for the gate to be lowered that the public would be more likely to run around the gates. Additionally, the railroads in

general own the property, and it is the public's responsibility to watch out for trains – not the other way around.

Lastly, a fourth core objective has been added with the PTC mandate, i.e. prevent a train from moving through a misaligned switch. Once initial three core objectives of PTC were established, the next challenge for RSAC was to obtain a status of PTC efforts across the industry.It was at this time that I had the first of a number o opportunities to present Communications Based Traffic Management (CBTM), the PTC effort for which I wa the architect at CSX.

CBTM was the first overlay approach to be developed, and as such it established the underlying basis for th current PTC pursuits by the freight railroads to meet the mandate. It also was the first overlay PTC project tha had to confront the point of vitality. My first presentation to the RSAC members stating that CBTM was not vita began a long education process to get past various perspectives of vitality that existed at that time, as follows First, key members of the FRA believed everything was vital in the overly-zealous spirit of zero tolerance fo risk. Second, Labor thought by not being vital meant that the vitalities (lives) of the crew members were no being protected, as in "Does PTC apply the brakes or not?" Lastly, traditional signaling personnel, whethe railroads or suppliers, view vitality as the state of failing safely, as in track circuits, relays, and control poin logic. Hence, their logic proceeds that anything associated with that infrastructure needs to be vital as wel thereby requiring extensive engineering, verification & validation (V&V), and duplication of hardware.

My challenge was to describe vitality in a fashion that would be acceptable to all. The solution was to introduc an operational / functional perspective in lieu of the regulatory, technical, or humanistic ones. Simply stated, I defined vitality as the means by which movement authorities are generated so as to maintain the integrity of train movements. Hence, with such a definition, it follows that PTC is not vital since it has nothing to do with the generation, or even transmission, of movement authorities. (BTW, it is for this reason that PTC can not improve traffic density as discussed in another Teddy Bear Posting: PTC Business Benefits.) As the result of this effort, one issue of my quarterly journal, Full Spectrum, was so dedicated and titled Vital's Vanity. As a closing point, it is appropriate to introduce here what is so often overlooked by people when they talk about vitality. That is, there is a threshold of vitality that exists whether the territory is signaled, non-signaled, and does or does not have PTC or other enforcement systems. I am referring to the Book of Rules.

Posted in Positive Train Control (PTC), Teddy Bears | Tags: Positive Train Control, PTC, Vitality | 1 Comment »

Teddy Bear – Operating a railroad safely requires signaling

June 7th, 2010 | Author: Ron Lindsey

"Operating a railroad safely requires signaling."

Major suppliers sell major signaling systems to major railroads for major bucks. But what about those small freight railroads, even those with some passenger service? Do they really require the traffic control systems that are offered to them; the ones that involve extensive investment in wayside infrastructure, communications, and back office systems? Additionally, what about those railroads that are being planned for difficult terrain subject to extreme weather, a lack of power, theft of equipment, and a lack of trained maintenance personnel? Do they need to confront these hardships on top of extensive investment and on-going maintenance costs to provide for a safe railroad?

While signaling does provide for safe operations, that is not its purpose. Signaling is used to provide capacity. I is possible to operate a railroad very safely without signaling, as well evidenced in North America. Specifically nearly half of the freight trackage in N.A. operates ***as non-signaled territory*** (albeit only 20% of the traffic meaning that there are no track circuits, no wayside or cab signals, and no code lines as required in Centralized Traffic Control (CTC) systems. The only technology requirement is that of some form of wireless communications that can be either commercial (satellite, cellular) or private network sufficient to provide fo voice communications. That's it for the infrastructure.

As to the vitality (i.e., the integrity of train movement), as noted in the post "There's nothing vital in dark territory.", the computerized conflict checking process is the simplest of a traffic control process that doesn't permit two trains to be in the same portion of track at the same time. In a way, this is not unlike the most ancient traffic control system based upon track occupancy referred to as *token block*. The key difference is that dark territory is programmed whereas token block' vitality can be readily compromised by lack of discipline with the manual efforts required; indeed this is the case in some countries where it is still in use.

The only issue with dark territory is the time required for the iterative, manual process of the dispatcher transmitting the movement authorities to the train crew followed by the *rolling-up* of the authorities once the train crew has reported the train's progress. With such a simple process, a decent size freight or passenger railroad can operate safely. Additionally, there are even ways to tweak dark territory operation to improve capacity even further, e.g., digital transmission of authorities, automatic roll-ups, embedded signals (without CTC), and the ability to throw switches from the locomotive. Lastly, with the combination of dark territory and Positive Train Crew (PTC), the railroad is assured of a safe operation both as to dispatcher errors and train crew errors respectively.

Also, Dark territory is really, really inexpensive. However, don't expect those major suppliers or consultants to share its existence with small to medium railroads. First of all, those supplier don't have a dark territory deliverable or mindset, and second, there is nothing for them to sell as to infrastructure and complex back office systems.

The team of railroad professionals at Maendeleo Rail is well experienced with dark territory operations as well as PTC. We can readily address the alternatives as to processes and wireless technologies, as well as determine the level of throughput that can be delivered for freight, passenger, or mixed traffic. Since we're independent of any suppliers, and instead look to partner with railroad operators, we provide low cost, highly efficient solutions.

Posted in Dark Territory, Positive Train Control (PTC), Signaling, Strategic Railroading, Technology, Teddy Bears | Tags: Dark Territory, PTC, Railroads, Signaling, Strategic Railroading, Teddy Bears | 2 Comments »

Teddy Bear – There's nothing Vital in Dark Territory?

May 29th, 2010 | Author: Ron Lindsey

"There's nothing vital in dark territory."

My ***Railroad Immersion Course*** has been used by railroads and suppliers alike to obtain a new perspective of railroad operations based upon advancing the traditional core technologies of communications, positioning, and intelligence, i.e., wireless voice, track circuits, and Computer Aided Dispatching (CAD), respectively. When giving the course to traditional traffic control suppliers, I address the difference between signaled and non-signaled operations (a.k.a., dark territory). Consistently, there is a point in the course where it makes a transition from a one-way lecture to a very interactive discussion. Specifically, it is when I ask the question: "So! What's vital in dark territory?" Without fail the response is "There's nothing vital in dark territory." And, with as much detente that my personality permits, I respond "Really?"

From their perspective there is an understandable reason why traffic control suppliers would respond as such in that dark territory operation is one in which they have little to no experience in that there is no wayside infrastructure required, and hence there is nothing for them to sell. Additionally, the term ***vitality*** to these folks has a very product-oriented perspective of failing safely, i.e., to not place the railroad in the position of additional risk upon a failure in the signaling infrastructure. Therefore, their logic would be that since there is no *product* along the wayside, then there is no vitality. Voila!

What traffic control suppliers don't consider is that vitality has also a functional perspective of insuring the integrity of train movements … which more specifically means that the movement authorities are generated in a fashion that provides for safe train movements; that indeed is the underlying requirement of signaling infrastructure after all. Therefore, to answer the question of what is vital in dark territory means identifying the source of movement authority generation. This is where the discussion really takes off.

Usually the second answer offered by the class is "The dispatcher is vital." Wrong!. Just as in signaled territory, the dispatcher does not generate the authority and therefore is not vital. He does indeed set up the authority generation process, as well as deliver the authority via voice radio. But, he does not generate the authority. In the old days, authority generation in non-signaled territory was provided by the train sheet, which is literally a piece of paper, upon which the dispatcher managed the allocation of track distance and time. The dispatcher abided by what the train sheet permitted him to do or not do as to the allocation of track. Today, the movement authority generation is a computerized program, a.k.a., conflict checker, that emulates the train sheet. The underlying logic of either the track sheet or the conflict checker cannot be simpler. That is, a specific portion of track can only be allocated to one train at a time. That's it (with some exceptions that are not important here). That's vitality in dark territory. Should the dispatcher wish to override this vitality in some fashion, then s/he has now become vital. But wait, there's more.

Once everyone is satisfied with that understanding, I move onto Automatic Block operation (ABS) which is the use of signals within dark territory operation, what I refer to as dark / lighted operation. In ABS, the signals function the same as they do in CTC territory, but the dispatcher is not provided with the aspects. Hence, it is dark to the dispatcher, but lighted to the train crew. Now the question to the class is two-fold. First, "Is ABS signaled operation or dark operation?" Second, "What is vital in ABS operation?" Those individuals who have been following the discussion up to that point usually respond quite well to these two questions. However, for hardcore signal engineers it is difficult to realize that the overall operation is dark (officially so) in that the initial movement authority to get the train into ABS was provided by the conflict checker. However, once in ABS, the train is subjected to a second level of authority from the signal infrastructure. Hence, there are two levels of vitality. But wait, there's more.

Once everyone is satisfied as to ABS, I now introduce the concept of work zones where maintenance crews have the authority for a portion of track for a given period of time. The question to the class then is "What's vital in a work zone?" Hopefully, by now they are able to respond that the Employee in Charge (EIC) of the work zone adds an additional level of authority to the train that has the movement authority generated by the traffic control system to move through the area. That is, the train crew must request permission by the EIC to enter the work zone when that zone is in effect. Hence, the EIC is vital within the work zone. But wait, there's more.

After this discussion, the class is now thinking about vitality from a functional standpoint. This leads to two more questions for their consideration … and which leads to forthcoming Teddy Bear Posts regarding the vitality of PTC and the vitality of transmitting authorities in non-signaled operations. By the way,check out a brochure for the Railroad Immersion Course.

Posted in Dark Territory, Signaling, Strategic Railroading, Technology, Teddy Bears | 3 Comments »

Teddy Bear – PTC Delivers Business Benefits?

May 17th, 2010 | Author: Ron Lindsey

"PTC delivers business benefits"

The claims of business benefits with the implementation of PTC seem to made by everyone including the suppliers, the Surface Transportation Board, and the Federal Railroad Administration. Contrarily, a recent study commissioned by the American Association of Railroads that was performed by the consulting firm of Oliver Wyman stated that in fact there are no business benefits. Who's right?

First, some background information is necessary to understand the history, logic, and perhaps the politics of this controversy.

There are several definitions for PTC, but only one true definition for that being deployed by North American freight railroads. That is, PTC is an ***overlay*** enforcement system that has 4 objectives, i.e., 1. Keep trains from hitting trains, 2. Keep trains from over-speeding, 3. Keep trains from endangering work zones, and 4. Keep trains from moving through misaligned switches. The key word here is ***overlay*** meaning that the method of operation by train crews or the traffic control systems does not change with the use of PTC. Simply stated, PTC is ***non-vital*** in that it does not affect the generation of movement authorities. PTC only enforces the parameters of the movement authorities that were generated by a traffic control system, whether it be signaled or non-signaled operation.

One point of confusion stemming from the past as to business benefits and PTC is due to the *Precision* Train Control (**PTC™**) effort by GE-Harris to implement a moving block operation on UP. That effort failed spectacularly for a number of reasons, including unrealistic expectations of delivering a vital office with a cost effective wireless data network. Unfortunately, many have confused overlay PTC with PTC™ which indeed would have delivered business benefits had it been implemented.

More recently there have been some unfortunate analyses made as to the business benefits of PTC. Unquestionably, the most notorious was the report requested by Congress and prepared by ZetaTech who, according to the railroads, simply dusted off a study they had done for BNSF a decade earlier regarding the advanced traffic management system ARES. ARES, like PTC™, would also have delivered business benefits, but it was never deployed. ZetaTech's paper did in fact expand beyond the BNSF study by adding consideration of shipment requirements and advancements in dispatching. Interestingly, had the report been titled "The Business Benefits of a Wireless Data Infrastructure", then it would have made for good reading. However, not only was the report totally off the mark in relating business benefits with PTC, but the presentation of the report made by ZetaTech to the industry missed two of the key core objectives of PTC. (Note: this paragraph has been modified from the original version given some feedback from an informed source.)

So, does or can PTC ***directly*** provide for increased business benefits? The answer is a definite ***NO***. The logic is very straightforward, as follows:

1. To improve traffic throughput, a railroad has to increase the efficiency of how the movement authorities are generated … or how they are used, e.g., operating at maximum allowable speed;
2. PTC does neither of those.;
3. Therefore, PTC cannot improve throughput;
4. In fact, PTC can actually decrease throughput if improperly designed as to the braking curves. That is, if trains are enforced unnecessarily by a PTC system due to inappropriate braking curves, then traffic throughput will suffer accordingly.

Prior to the final rulemaking regarding PTC, there was the possibility that the deployment of PTC could be used to safety-justify various changes in operations that would deliver business benefits. That is, the argument by railroads would have been to use PTC to provide a net increase in safety when deployed with one-person crews,

for example … or removing signals in low-traffic corridors. Now with the PTC mandate, those possible tradeoffs are no longer available it seems.

The really unfortunate part of the PTC – business benefits controversy is that it is contributing to a substantial lack of business benefit pursuits that could be made with the advancement of a wireless data infrastructure that is now required for PTC. That is, it is the wireless data infrastructure that can deliver the business benefits that are falsely associated with PTC. PTC is just one application on the wireless data infrastructure as are traffic management, fuel utilization, locomotive diagnostics, work order, wayside detectors, etc.

Prior to the PTC mandate, the railroads were moving individually on wireless data systems, but without a true, holistic business strategy of what a wireless infrastructure could deliver. Now, at least they are moving together as an industry in the pursuit of a wireless solution, albeit an overly-design and overly-expensive one, but they still don't have a business strategy of how to use the infrastructure. The focus is only on PTC, and the fatuous statements that PTC will deliver business benefits is going to be very costly for the railroads, both individually and as an industry, as the railroads ignore such opportunities with or without PTC. The pathetic truth currently is that not only does PTC not deliver business benefits, but its pursuit to meet the December 31, 2015 deadline is actually preventing the realization of major business benefits.

Posted in Positive Train Control (PTC), Technology, Teddy Bears, wireless | Tags: PTC, Teddy Bears | 1 Comment »

Teddy Bears – Scheduled Railroads

May 13th, 2010 | Author: Ron Lindsey

"We run a scheduled railroad"

Last week I was reading a Rex Stout Nero Wolfe Mystery, *The League of Frightened Men*, published in 1935. Known for his verbal bashings, the title character offers the following in a conversation with a suspect in a murder.

> "It occurs to me that no publication either before or since the invention of printing, no theological treatise and no political or scientific creed, has ever been as narrowly dogmatic or as offensively arbitrary in its prejudices as a railway timetable…. You know that idea could be developed into a first-rate little article. Six hundred to seven hundred words, about *The Tyranny of the Wheel*, you could call it , with a colored margin of trains …"

Hmmm! I like the suggested title and perhaps I can turn that into a future ***Full Spectrum***. But the truth is that ¾ of a century later, the freight railroad schedules are anything but schedules. One of my favorite quotes is from a discussion with a Class I Service Design executive several years ago when I questioned him about how scheduled his railroad was. He stated: "Well! We're not totally unscheduled." That's seems about right given that another knowledgeable individual stated recently that only 30% or so of a railroad's operations are truly scheduled. But then again, what is a scheduled railroad?

For the traditional operations manager, a schedule seems to be the lineup that was set up within the last 24 hours with continuous changes as deemed necessary. That is not a schedule as in how an airline runs with specific crews, specific aircraft, and even specific gates locked into a specific time table. Indeed, there are some reasons why a railroad has difficulties in maintaining a schedule that has been developed by Service Design, e.g., a labor action at a major seaport. But there are so many reasons that are truly manageable, and therefore not justified excuses, for going off schedule. For example, there are major shippers who determine when the trains would run.

The operating executives will use that as an excuse as to why the schedule must be flexible. What they don't ask is what does the railroad need to do for that shipper to get a real schedule? E.g., more reliable service, contractual agreements with potential penalties for both parties, etc. One of the major explanations from railroad management of why their railroad must have a *flexible schedule* is that the railroads with which they interchange do not run to schedule. This mutual abuse is always the other railroad's fault, it seems.

But what is the problem for not maintaining a true schedule. Again, I quote an ex-executive for a Class I when I asked him if he ran a scheduled railroad. " Hell yeah, we run a scheduled railroad. And, almost every day I am able to save a few crew starts by cutting short trains." Then I asked: "But what happens when the locomotives don't show up in Chicago?" Without hesitation he proudly proclaimed. " No problem, we have plenty of locomotives up there." The example here is that operating executives can't stand what they believe are the inefficiencies of short trains. What they don't understand is that ***unstructured inefficiencies*** that they create by chaotic management of the lineup that has been configured by Service Design are greater than the ***structured inefficiencies*** that were built into the schedule. The latter is what airlines do with their schedules. It has only been in the last few years that major airlines have learned to compliment monthly scheduling with daily adjustments. By doing so, they risk losing customers that get angered by canceled flights. They understand their business and they know that their overall on-time performance is actually quite good. That's the trade-off that they can make … that they deserve. Railroads are no way near that level of customer reliability.

Posted in Teddy Bears | Tags: Scheduling, Teddy Bears | 1 Comment »

Teddy Bears – popular but erroneous notions in rail

May 12th, 2010 | Author: Ron Lindsey

Industry management comfortably clings to a number of convenient, but ill-justified, statements and beliefs that greatly affect the current efficiency of operations. These ***Teddy Bears*** are also restricting the opportunities to advance operations via the deployment of advancing technologies and associated business processes. Nonetheless, railroads, suppliers, and regulators alike embrace them partially due to a combination of traditional practices and a lack of understanding of the technical & financial issues. Most importantly, however, it is the lack of executive management directives along with the proper resources that prevents the development of pragmatic, achievable strategic technology plans in sync with strategic business plans for the railroads, both individually and collectively.

I'm creating a new category of post dedicated specifically to Teddy Bears. Interspersed with my regular posts on strategic railroading, these posts will be dedicated to exposing "*Teddy Bears*" in the railroad industry. Hopefully, discussion on the topic will be the beginning of the end for these ill-conceived fallacies.

Stand by for the first "*Teddy Bear*" post, coming soon.

Posted in Teddy Bears | Tags: Teddy Bears | 1 Comment »

The Mobile Node – A Missing Isssue in the Positive Train Control Debate

May 3rd, 2010 | Author: Ron Lindsey

The Illusive Mobile Node

Is it politics or perspective that is causing the PTC debate to derail?

As discussed in the *Last Mile* posting, US railroads are still failing to take on the strategy of incorporating the advanced business applications that can be achieved with the wireless data path required to support Positive Train Control (PTC) so as to most effectively manage their resources.

Specifically, the voice radio and signaling infrastructures that are currently depended upon to provide train status data to the traffic control systems, are unable to deliver the timeliness and completeness as to both location and speed data for trains so as to permit the use of meet /pass planners that could optimize the railroads' most dense and most critical operations. Therefore, this primal infrastructure needs to be advanced, and to do so effectively requires a perspective that integrates the three principle technology platforms (communications, positioning, and intelligence) to form a *strategic core technology infrastructure*. In this post, I address intelligence, i.e., the processing power for applications, of such an infrastructure. The other two platforms will be addressed in following postings.

With the shift from the mainframe of the 60's to that of client / server of today, intelligence has made the transition from being only centralized to that of being distributed with seamless flexibility between the two, at least for those industries whose distributed resources are fixed as to location. For these *fixed node* operations, the challenges for distributing intelligence tend to be less technical and more functional as how to optimally allocate the processing power across a mesh of private and commercial networks, internet, and back office systems. But, what about railroads where the assets are mobile and, even worse, where those assets traverse across railroad boundaries? This convoluted concoction of mobility and interoperability adds new dimensions to distributed intelligence far beyond those of fixed node, thereby necessitating a *mobile node* perspective with philosophical, technical, and functional considerations garnished with industry politics.

From a ***philosophical*** standpoint, the mobile node should be viewed as an extension to the IT architecture, meaning that the discipline and expertise well established in the traditional wired-IT environment should be imposed upon mastering the wild west of wireless. In short, this means that railroads and suppliers alike need to coalesce wireless and IT expertise into a dedicated *Mobile Computing* organization in lieu of the parallel lines on an organization chart that are too often the case today.

As to a ***functional*** perspective, the deployment of mobile nodes offers the extraordinary opportunity to rethink business processes that can take advantage of unprecedented connectivity and the timeliness and accuracy of position and speed data that wireless data afford (think UPS or Fed Ex). For some this may be extraordinarily uncomfortable when they are confronted with revisiting the functionality of their traditional back office systems, e.g., how would train dispatching be done with train speed and location data available every 5 minutes?

Unlike the fixed node, the mobile node is ***technically*** challenged by both the constraints of the communication medium and the physical environment in which it operates as well as the requirements of interoperability. As to communications, the mobile node must be able to strut its independence given that the wireless throughput is relatively limited and unreliable compared to a fixed node's wired throughput. As to the physical environment, what could be worse than the cab of a locomotive or a maintenance-of-way vehicle? For this challenge I subscribe to the screwdriver-penetration test, a railroad's version of *Psycho*'s shower scene applied to on-board equipment.

Given the extensive interchange of trains between railroads in North America and the EU, there is often the issue of ***interoperability***, i.e., the ability of foreign equipment to provide the desired functionality on a railroad's property. There are only a few applications that have been recognized for this intra-industry pursuit. Unquestionably, the most important for this discussion is that of Positive Train Control (PTC) which has been mandated by the US Federal government for implementation across the major freight and passenger railroads before 2016. With an unprecedented level of cooperation, it would seem to many, that the primary 4 Class I railroads in the U.S, via a joint effort referred to as the Interoperability Train Control (ITC) agreement, are

working on all aspects of interoperability to meet the deadline. The ITC efforts are being handled by 7 technical committees: Architecture, PTC Application, Wayside Signal, Messaging, On-board Platform, Communications Steering, and Data Management. The standards that come out of these committees are to be available by January 2011.

However, there are still 2 major points to consider. The first is that the effort does not have any purpose other than that of PTC. While many railroaders and suppliers will state the business benefits of PTC, they fail to recognize the foolishness of their own hype. Simply stated, it is the wireless path now required for the mandate PTC effort that will finally deliver business benefits not PTC itself; PTC is just one user of the wireless data infrastructure. BUT, the ITC efforts are not providing a business perspective of the on-board platform that would deliver a true ***mobile node perspective*** that could handle not only PTC, but also support business-value applications such as pacing, locomotive tracking, fuel consumption, in-train monitoring, etc.

There is also another reason that the ITC efforts are less than complete, certainly not altruistic, if not a bit misleading; it is the issue of ***industry politics***. That is, each major railroad came to the ITC table with a very different technology agenda. There are solutions to address these differences, and the railroads more than ever are working in that direction. However, I believe the solution to develop a single technology platform is poorly evaluated as to both scope and costs, while other wireless spectrums are being very poorly utilized, i.e., Meteorcomm and narrowband 160-161 MHz … clearly a discussion for a forthcoming post.

Posted in Positive Train Control (PTC), Railroad Business, Technology, wireless | Tags: Positive Train Control, PTC, Technology, wireless | No Comments »

The Last Mile – the 80/20 productivity gain the railroads are missing

April 29th, 2010 | Author: Ron Lindsey

As of two years ago, the advancement in railroad operations had stalled at the end of the wire, literally. While railroads have invested heavily in the backbone communication and signaling infrastructures that define the perimeter of their IT and traffic control architectures, the primary assets that need to be managed (trains, crews, locomotives, maintenance crews) operate beyond the reach of those tentacles.

Unfortunately, railroads continue to rely on track circuits and voice radio for managing trains and thereby the locomotives, train crews, and yard utilization. Accordingly, the back-office dispatching systems are so geared to provide a level of traffic management that can no longer service the railroads' markets during peak periods. The net effect of such inefficiency is two-fold: 1. railroads have turned away (or lost) business during peak market periods, and 2. railroads are paying a severe price to obtain and maintain excessive resources, e.g., locomotives and crews.

Suddenly and unexpectedly in 2008, the Congressional mandate for Positive Train Control (PTC) in the Rail Safety Improvement Act of 2008 delivered the requirement for the railroads to advance wireless data networks, both individually and as an industry.

Suddenly, there was some hope by the few progressives in the industry that the PTC mandate would lead to a broad understanding of what the required wireless data infrastructure could do for rail operations.

Shortly thereafter, but not surprisingly, all such hopes were dashed as the railroad technicians sunk their teeth into this new opportunity to provide a new, most advanced, extremely tailored wireless data platform that could be envied by all and do all …but without any desire, recognition, or management directive to consider other than PTC.

Shamefully, this wasn't the first mandate from the Feds that could have led to a revitalization of a railroad's

operations via wireless. The FCC had issued a Point & Order referred to as *Narrowbanding* that effectively requires the railroads to replace their extensive 160-161 MHz infrastructure consisting of 250,000 analog devices with digital equivalents by January 1, 2013. However, this requirement has been viewed by the railroad technicians as a technology investment issue and not as an opportunity to advance operations.

Amazingly, after two extraordinary opportunities to advance railroad operations with an advanced wireless platform that required no justification other than a Federal mandate, there is still no real focus on the ***Last Mile*** as to optimizing the capacity and productivity.

The phrase ***Last Mile*** is not a new one for some industries where it has been used to describe alternatives to deliver cable services in the 1990's as well as to providing communication infrastructures in developing countries, and most recently to define new markets for advancing mobile services. The phrase is also used to define the delivery of goods that is beyond the railroads' physical infrastructure and that is provided by trucking firms. In this latter case, the intermodal industry has emerged as a seemingly seamless transportation offering the combination of rail, trucking, and maritime. Taking that approach to the last mile relative to a railroad managing its own resources is directly comparable, i.e., developing and merging the necessary technologies into a seamless technology platform that I refer to as the ***core technology infrastructure.***

Simply described, the core technology infrastructure is the integration of communication, positioning, and intelligence technologies that supports the basis of a railroad's operations. Today, that infrastructure is a ménage of voice radio and backbone networks as to communications, track circuits for positioning, and control points enslaved by CTC systems for intelligence. This infrastructure provides a level of block positioning data, but without train speed, that constrains the effectiveness of managing traffic to that of being reactive to conflicts in the meeting and passing of trains. With improved timeliness and accuracy in both train position and speed information, the railroads can achieve an advanced operating practice of ***Proactive Traffic Management*** (PTM) that I introduced to the industry in 2005.

PTM is the ability to see the future state of a railroad's operations so as to provide solutions to minimize, if not avoid, foreseen traffic conflicts. It does so by projecting the current status of trains by feeding both timely and accurate train position and speed data to sophisticated meet / pass planners aligned with a railroad's operating objectives. For traffic management, the frequency of such data is dependent upon traffic density and the type of traffic control. To be brief here, that means the reporting frequency of position and speed data ranging from 5 to 15 minutes in addition to AEI and CTC's on-station (OS) reports. This is what I refer to as ***in-time*** data.

To obtain in-time data requires a strategic perspective of the core technology infrastructure, a perspective that needs to be both evolutionary and revolutionary. As to the former, the railroads should be able to leverage their current, massive communications infrastructure to obtain the level of in-time data required. The most obvious opportunity here is the conversion of the current analog, voice-based VHF infrastructure to a digital, data-based one … justified by the rational understanding that by doing so the railroads could avoid the $1 billion investment in the 220 MHz platform for PTC. As to a revolutionary perspective, obtaining PTM will mean making significant changes in the traffic control processes that stem from the 1st qtr of the last century. Such changes are supported by integrating advanced communication, positioning, and intelligence technologies that have yet to successfully storm the innovation barricades of both the railroads' and traditional suppliers' engineering departments. A critical design point in developing a strategic core technology infrastructure is to not fall for the fallacy of zero tolerance – 100% efficiency, to not drive towards unrealistic, if even achievable, goals such as moving block dependent upon *real-time* data.

To do the ***Last Mile*** requires a strategic technology plan in sync with a strategic operations plan. It requires ***Strategic Railroading***.

Posted in Positive Train Control (PTC), Strategic Railroading, Technology, wireless | Tags: Positive Train Control, PTC, Strategic Railroading, Technology, wireless | No Comments »

The Strategic Technologist

April 20th, 2010 | Author: Ron Lindsey

Why are you reading this posting? Perhaps what caught your attention is the peculiarity of the title. After all neither of the words *strategic* nor *technologist* are easy to find individually, yet alone together, in the North American rail industry. The fact that you came to a blog called *Strategic Railroading* is itself most appreciated But the *Strategic Technologist* is one additional leap of exploration.

Neither railroads nor suppliers traditional to the rail industry employ ***technologists***, i.e., those individuals tha address a pragmatic deployment of technologies based upon cost-effective analysis. Accordingly, neithe railroads nor suppliers have comprehensive strategies as to the deployment of advancing technologies aligne with progressive business processes (i.e. Strategic Railroading). Instead, both rely on ***technicians*** who ar chartered with keeping on with evolving generations of technologies without delivering a business perspective a to how advancing technologies can best be utilize to improve the railroads' business processes.

Unquestionably, the most critical example of this dire situation until recently has been that of the two primar technology infrastructures that the railroads continue to depend upon for their operations: track circuits fo signaled territory and voice radio in dark territory. These two technologies have their roots in the first an second quarters of the 20th century, respectively. As such, the dispatching systems dependent upon these ancestral technologies are geared only for ***reactive*** traffic control vs. the opportunities for ***proactive*** traffic management. The difference between the two is substantial when the dysfunctional train dispatching (to be kind) of the former is compared to the latter's ability to re-plan train movements to avoid foreseeable traffic conflicts based upon timely knowledge of train speed and location knowledge that is not available via the current reliance on track circuits and voice radio.

The technicians are not solely at fault here in that there are no ***operation strategists*** pursuing the advance business opportunities across a railroad's system that advancing technologies could support. Operations management lacks the awareness, and heretofore the impetus, to pursue more effective means of running the railroad. The net result is that there is neither strategic business nor strategic technology plans within the railroads, yet alone the critical synergistic link between the two. Keep in mind, that each railroad will readily claim that they in fact do have a strategic technology plan. However, it is at best a plan to integrate wireless data-based applications into the IT infrastructure in a "real time" fashion. As will be discussed in other posts, the phrase "real time" is a major indication that there really isn't any true technology plan. With the exception of moving block operations, which have been rightfully rejected by freight railroads, real time is a completely unnecessary goal for wireless systems … and a very expensive one if truly pursued.

Unlike any other time in the history of North American railroads, there are now several key market drivers that demand a change in the way of deploying technologies and, more important, in rethinking the primary business processes. I am referring to the Congressional mandate to deploy PTC before 2016, and the FCC Refarming Point and Order that will require a $1 billion investment in the VHF -161MHzinfrastructure between now and 2013. The former requires the availability of a wireless data system for which the railroads technicians have decided to deploy a capital intensive 220 MHz network parallel to the 160 MHz infrastructure, thereby essentially doubling the capital investment . There is little justification for parallel networks in my opinion in that the refarmed 160 MHz could readily handle the current requirements as well as those projected for PTC. The only rational reason, but inexcusable nonetheless, is that ***technicians*** made the decisions to avoid the complexity of a proficient 160 MHz platform and instead saw the opportunity to create a new network. That is what technicians like to do and the railroads will pay heavily for this traditional, myopic perspective.

Enter the ***Strategic Technologist***: a conceptualist that determines the demand for critical information flow and subsequently designs the technical architecture to service that demand in a cost-effective, holistic fashion across the railroad's system. This blog will be covering a number of underlying issues associated with the role of the

Strategic Technologist relative to Strategic Railroading.

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Introduction to Strategic Railroading

April 9th, 2010 | Author: Ron Lindsey

Strategic Railroading™

Since their introduction nearly a century ago, the deeply-rooted operating practices of railroads have normally been adequate in servicing the traffic requirements of the railroads. But, in times of heavy demand, those practices are not sufficient to provide the necessary capacity.

The traditional means to meet high demands is to increase the raw capacity via significant capital investments in infrastructure, rolling stock, and locomotives. Improving the effective capacity, i.e. the boundary placed upon the raw capacity by the operating practices, has not been a consideration. However, with the substantial advancements in technologies in the past decade, railroads can now increase their effective capacity in selected corridors without investment in raw capacity. But, it takes an operations strategy in sync with a technology strategy.

It takes Strategic Railroading.

The phrase Strategic Railroading may seem a bit oxymoronic. After all, the rail industry is a very traditional one with its primary operation practices and processes having not changed since the 1st qtr. of the last century. This is so because the set of the 3 core operational technologies, the core technology infrastructure if you will, has not changed, i.e.,

1. Positioning: track circuits
2. Communications: voice & signals
3. Intelligence: dispatchers using non-intelligent Computer Assisted Dispatching platforms (CAD)

Indeed, a railroad's operational practices and processes based upon these technologies are well established as are the associated business practices and processes including customer service, fueling, maintenance, and the interchange of trains between railroads.

The railroads have yet to make the quantum transition from traditional technologies and operations to those advance capabilities afforded by having timely resource data
being used by advanced planning and execution tools. Additionally, the railroads
have yet to look beyond their own borders to take an industry perspective that benefits all. To make such transitions will require technologists and a reality that wireless data infrastructure, with or without the pursuit of PTC, provides the means to make such advancements. At this point without such understanding, the railroads are destined to spend extraordinary amounts of capital on raw infrastructure, including parallel wireless platforms, while realizing only a small portion of the business benefits that could be achieved via Strategic Railroading.

To learn more about Strategic Railroading – download our brochure.

Posted in Strategic Railroading | Tags: CAD, Strategic Railroading, traffic management, wireless | 3 Comments »

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Strategic Railroading™ has one goal - maximize return on assets.

Given recent advances in telecoms and technology there is now an unprecedented opportunity to advance railroad operations via new technologies and advance the integration of high speed rail with freight operations. Real-time traffic management and communication is possible without significant development and deployment costs, but it will take a technology strategy working hand-in-hand with an operational strategy, it will take Strategic Railroading.™

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